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8 April 1952

## RT-6XX MODIFIED TRANSMITTER

- 1.0.0. Modifications for improving operation, efficiency and physical ruggedness.
- 1.1.0. Investigation of oscillator coil indicated room for improvement from a standpoint of higher "Q". Tests indicated low values of drive to power amplifier which were traced to low "Q" of the oscillator coil. By experiment coils were designed using a powdered iron core for the low band portion along with spacing of coil turns. A toroid form of coil was tried with little improvement over the slug type. Final coil employed G-I-C core material and conventional coil form.
- 1.1.1. The high band oscillator coil was developed using a toroid form of G-2 iron. Experimental model employed a G-2 cup for lack of toroid form. "Q" values in the magnitude of 200 were obtained. The high band coil was physically mounted at the top end of the low band coil form. Electrical connection employed the high band coil in series with the low band coil for low band operation.
- 1.2.0. Replacement of the 6AG5 oscillator tube with a type 6BC5 tube gave an increase in drive to the power amplifier. This coupled with the higher efficiency oscillator coils gave a satisfactory result and improvement over the original coil and tube arrangement.
- 1.2.1. The substitution of the 6BC5 tube does not require socket or resistor value change. The 6BC5 tube does not carry JAN rating at this date.
- 1.3.0. The investigation of the power amplifier plate tank was undertaken with a view toward improving the efficiency and physical ruggedness of the coils. Although the measured coil "Q" of the original coils was high (150 - 170) there was poor support mechanically along with very fragile construction with close turn spacing.
- 1.3.1. A low band tank coil was designed employing G-5 core material in the form of eight equally spaced slugs within a perimeter inside the coil. Further slugging employed by using a GKC core of .375 inch diameter in the center of the form. This arrangement enabled the actual turn count to be reduced along with the utilization of larger wire with wider turn spacing. Coil "Q" measured 220.
- 1.3.2. Mounting of the low band coil was changed so that coil was positioned further away from surrounding metal, such as chassis and cover.
- 1.3.3. Further improvement of operation was accomplished by thin copper sheeting placed between coil end and bottom cover.

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- 1.3.4. The high band power amplifier tank was designed with a coil form of solid material (lucite experimentally) of larger diameter (1") than original coil. Larger wire plus wider turn spacing was incorporated. Coil "Q" measured at 200.
- 1.3.5. Mounting of the high band coil same position as original coil but winding removed further from surrounding metal and further improved by copper as in 1.3.3.
- 1.4.0. Investigation of operating efficiency on the high band position indicated some improvement when low band coil was disconnected from its parallel position with the high band coil. Consequently, the jumper on the band switch was removed thus allowing the high band tank to operate without any possible effect of the low band coil.
- 1.5.0. Operational tests undertaken using 70, 600 and 1200 ohm dummy loads indicate an improvement in overall efficiency, power output and plate efficiency, which, although the actual increase is slight, the ruggedness of construction and ease of modification fully warrants the change.
- 1.6.0. The above modifications are a means of quickly and efficiently improving the construction and operation of the present RT-6XX modified transmitter.
- 1.6.1. It is entirely practical to consult entire plate tank assembly, oscillator assembly and copper shield plate as replaceable units requiring simple connections for replacement in present RT-6XX modified transmitters now in use in the field, as well as quite practicable to incorporate these same assemblies in future units to be manufactured.
- 1.6.2. Further improvement of operation and construction would require complete and radical redesign of the entire transmitter unit both from an electrical and mechanical standpoint accompanied by many more man hours of engineering than is advisable at this time.

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